Icebergs

Post Lesson Plan 1 / EE

Age: Grades 6-8

Setting: Classroom

Standards: Science and Technology: 3.2.7C, 3.5.7D

Objectives: Students will be able to explain why:

1. The salinity (amount of salt) of water affects the buoyancy (floatability) of ice when the water is frozen.
2. The greater the salinity of an iceberg, the smaller the percentage of the iceberg stays beneath the surface of the water when it floats because of its greater buoyancy.
3. The size of an iceberg has no affect on the percentage of the iceberg that remains beneath the surface of the water.

Overview:

The purpose of this experiment is to give students an understanding of the properties of icebergs. In doing so, it allows students to understand the relationship between salinity. size of an object, and density**.**

Materials:

You will need access to a freezer. The following materials will be required for each group of students:

- Four paper cups (two large and two small)
- Tap water
- Salt
- A measuring cup
- A large clear plastic container
- A ruler

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Procedure:

1. Explain to the class that they are going to design and conduct an experiment using the scientific method to demonstrate the affect of salinity, or amount of salt, on floating icebergs. Their experiments will answer two questions: "Does the presence of salt in an iceberg make the iceberg more buoyant?" and "Is a small iceberg more buoyant than a large one?"
2. Divide the class into groups and ask each to form a *hypothesis, an educated guess,* to each question. Have each group write its hypothesis on a sheet of paper.
3. Discuss and design as a class a way to test the educated guesses of all the groups. Ask questions that lead students to understand the following procedure.
4. Give each group the materials in the materials list. Instruct each group to create four model icebergs by freezing the contents of the four paper cups as follows: one small cup filled with plain tap water, one large cup filled with plain tap water, one small cup filled with salt water, one large cup filled with salt water. (Students can create salt water by dissolving 50 grams of salt in a half liter of tap water.)
5. When their icebergs are frozen, the students should remove them from the cups and float them, one by one, in a clear plastic container filled with tap water. Before this procedure, discuss with the students how they will accurately test their hypotheses. (Their answers should involve measuring the heights of the parts of the icebergs both above and below the surface of the water.)
6. Once in the water, students should measure the height of each iceberg with a ruler. They should then separately measure the part of each iceberg that is above and below the surface of the water. Students should calculate the percentage of each iceberg that is below the surface of the water. They should record their findings on a chart, such as this one:

Fresh	**Salt**	
Large	% below surface	% below surface
Small	% below surface	% below surface

Assessment:

Have groups discuss their findings and determine whether their data confirms their hypotheses. Students should conclude that size has no affect on the buoyancy of an iceberg. The higher the salinity, the more buoyant an iceberg will be.